



NIJ CBRN Protective Ensemble Standard Program

Bill Haskell

NIJ Special Technical Committee - Member

NIOSH PPT Stakeholder Meeting

Law Enforcement Breakout Session

29 March 2011





Why Develop a CBRN Ensemble Standard for Law Enforcement?

- Existing standards address CBRN protection for many emergency responders (HAZMAT, fire service, technical rescue, and emergency medical service)
- No existing standard fully addresses law enforcement needs
- DHS grant programs limit procurement of CBRN ensembles to those compliant with standards adopted by DHS



Result = procurement of ensembles that are neither designed for nor tested to meet requirements of the law enforcement community



Law Enforcement Requirements

Examples include:

- Durability
- Different threats (i.e., human threat)
- Dexterity (operating firearm)
- Stealth operations
- Compatibility with other mission-essential equipment (communications, ballistic-resistant armor, helmets, etc.)





NIJ CBRN Protective Ensemble Standard Effort

Special Technical Committee (STC)

Advisory Working Group (AWG)

Steering Committee (SC)



Special Technical Committee

- Began work in August 2007 and completed work in May 2009
- Responsible for developing the performance standard and related documents for CBRN ensembles for law enforcement
- Membership:
 - Law enforcement practitioners with relevant experience & expertise
 - Stakeholder organizations represented include: NFPA, DHS, DEA, FLETC, FOP, IACP, NSA, NTOA
 - Technical experts from NIST/OLES, DOD, NIOSH, UL, and SEI (engineers, scientists, test labs, conformity assessment bodies, standards development organizations)
 - Standard was released in November 2010



Special Technical Committee

Law Enforcement Practitioners

Member	Organization
Capt. Ed Allen	NTOA (Seminole County SD)
Ed Bailor	US Capitol Police (Retired), STC Chairman
Mike Brown	National Sheriff's Association
Hugh Breslin	Federal Law Enforcement Training Center
Lt. Kevin Sommers	Fraternal Order of Police (Warren PD)
Jerry Craig	Drug Enforcement Administration
Martin Hutchings	National Bomb Squad Advisory Board (Sacramento County SD)
Dave McBath	International Association of Chiefs of Police (NYSPD)
Lt. Tom Nolan	NTOA (Upper Merion Township PD)
Charles Onesko	FBI Hazardous Materials Response Unit



Special Technical Committee (continued)

Technical Experts

Member	Organization
Heather McArthur	Phoenix Police Department
Patricia Gleason	Safety Equipment Institute
Gordon Gillerman	National Institute of Standards and Technology
Bill Haskell	National Institute for Occupational Safety and Health
Tom Neal	ASTM International
Gene Stark	Department of Defense
Stephanie Elder	US Army Soldier Research, Development and Engineering Center – Natick
Elaine Stewart-Craig	Edgewood Chemical and Biological Center
Steve Corrado	Underwriters Laboratory



Advisory Working Group (AWG)

- Provides oversight and guidance to the STC during standard development effort
- Comprised of senior-level personnel from the following organizations

NIST/OLES: Phil Mattson

DHS: Jim Hagy

NFPA: Bob Vondrasek

FOP: Tim Richardson

NTOA: John Gnagey

IACP: Joel Leson/Dave McBath

IAB: Bob Ingram

NSA: John Thompson



Steering Committee

- Purpose is to provide overall direction of the effort and to review the completed standard and related documents
- Consists of the following senior advisors:

NIJ Deputy Director for Science and Technology: Dr. John Morgan

DHS Science & Technology Standards Executive: Dr. Bert Coursey

NIST/OLES Director: Mark Stolorow



Standard and Supporting Documents

1. **Equipment Standard**: Defines minimum performance requirements and test methods to assess performance
2. **Conformity Assessment Requirements**: Details the requirements for ensuring that a product or process conforms the standard
3. **Selection and Application Guide**: Provides information to assist law enforcement agency decision-makers, procurement officials, and end users



CBRN Ensemble Standard



- Built on related work by Natick (funded by DHS), NFPA, and other organizations to minimize time needed to create a new standard for law enforcement
- Modeled the new standard after existing NFPA CBRN/Hazmat Standards
- Law enforcement requirements incorporated in ensemble classification levels, ergonomic testing, noise generation criteria, durability requirements, etc.



Standard

Defines minimum design and performance requirements and test methods to verify performance

1. Purpose, Scope, and Application
2. References
3. Definitions
4. Form and Fit Requirements
5. Performance Requirements
6. Test Methods
7. Labeling and Information





Major Features of the Standard

- Scope: Standard establishes the minimum requirements for ensembles and ensemble elements designed to protect law enforcement personnel from CBRN hazards:
 - Chemical warfare agents (CWAs)
 - Toxic industrial chemicals (TICs)
 - Biologically derived toxins or pathogens
 - Radiological particulate hazards
 - Clandestine drug laboratory exposure hazards
- Ensemble elements: Garment, hand protection, foot protection
 - Garment: protects upper and lower torso, arms, legs, and head



Major Features of the Standard (Cont'd)

- 4 Law Enforcement Response Levels (LERs) based on mission requirements, expected mission duration, durability requirements of different operations and activities, and hazards in the CBRN threat environments
- Design Requirements, such as interoperability and integration with law enforcement mission-specific equipment
- Performance requirements and test methods to assess whether or not requirements are met



Law Enforcement Response Levels

- **Law Enforcement Response Level-1 (LERL-1)**
 - Conditions unknown or known to be above Immediately Dangerous to Life and Health (IDLH)
 - Requires use of Self Contained Breathing Apparatus (SCBA)
 - Requires Flame Resistance (FR) Protection

Example Mission Scenario: High-risk tactical entry into a building containing chemical warfare agents or toxic industrial chemicals or into a suspected clandestine drug lab



Law Enforcement Response Levels

- **Law Enforcement Response Level–2 (LERL-2)**
 - Conditions unknown or known to be above IDLH
 - Requires use of SCBA

Example Mission Scenario: Hostage-taking incident where there is a potential dynamic entry into an environment where chemical warfare agent or toxic industrial chemicals are being used or implied as a weapon



Law Enforcement Response Levels (Cont'd)

- **Law Enforcement Response Level-3 (LERL-3)**
 - Known to be below IDLH
 - Requires use of Air Purifying Respirator (APR) or Powered Air Purifying Respirator (PAPR)

Example Mission Scenario: Tactical building search in an environment where chemical warfare agents or toxic industrial chemicals are present and monitoring has determined that level to be below IDLH



Law Enforcement Response Levels (Cont'd)

- **Law Enforcement Response Level-4 (LERL-4)**
 - Known to be below IDLH
 - Requires use of APR or PAPR

Example Mission Scenario: Securing a perimeter in an environment where chemical warfare agents or toxic industrial chemicals are present and monitoring has determined the level to be below IDLH



Form and Fit Requirements

- Ensembles shall protect the wearer's entire body including the upper and lower torso, legs, arms, head, hands, and feet.
- Ensemble elements include protective garments, hand protection, and foot protection.
- Garments and footwear shall be provided in at least 8 distinct sizes each.
- Hand protection shall protect from the fingertip to at least 1 inch beyond the wrist crease.



Important Law Enforcement Test Methods

- Ergonomics Tests:
 - Donning and Doffing Tests
 - Gross Body Mobility Tests
 - Dexterity Tests: Glove Fine and Gross Dexterity Tests
 - Field of View Test
 - Tactical and Perimeter Scenario Tests (developed by STC)
- Audible Signature Test (developed by STC)
- Color/Visibility Test (developed by STC)



Certification Program

- Purpose is to demonstrate that products available to law enforcement are tested and evaluated to meet or exceed the requirements of the standard
- Third-party certification of CBRN protective ensembles to the requirements of the NIJ standard
- Initial and periodic evaluation of products and facilities
- Accreditation requirements for certification bodies (ISO/IEC Guide 65) and for test laboratories (ISO 17025)



Selection and Application Guide

- Provides information to assist law enforcement agency decision-makers, procurement officials, and end users
- Description of the applicable NIJ standard and conformity assessment program in non-technical terms
- Importance of wearing CBRN protective ensembles
- Guidance for selecting most appropriate technology
- Maintenance and care of equipment
- Applicable Codes and Regulations
- Recommended Training





Opportunities for Stakeholder Input

- 3 AWG briefings
- Steering Committee briefing
- Presentations at numerous conferences, meetings, and workshops
- Public comment period



Review by the AWG

- March 26, 2008 – Briefing of the overall effort including status to date
- July 18, 2008 – Discussion prior to release of draft standard and certification program requirements for public comment
- March 20, 2009 – Discussion of final documents
 - AWG verbally concurred with documents



Public Review and Comment

- Public comment period for standard and certification program requirements
 - Announced via Federal Register Notice.
 - Documents posted on www.justnet.org.
 - Comments given via internet.
 - Open from August 11, 2008 – September 24, 2008
- ~ 600 Comments received (many repetitive due to structure of standard)
- Each comment was reviewed and discussed by the STC
- Changes were made by the STC based on public comments



Public Comments (Continued)

Section	Number of Comments
Ch 1 Scope/Purpose/Application	53
Ch 2 References	4
Ch 3 Definitions	78
Ch 4 Design Requirements	41
Ch 5 Performance Requirements	161
Ch 6 Test Methods	182
Ch 7 Labeling and Information	25
Annexes	3
General/Front Matter	15
Certification Program	18



Public Comments (Continued)

- Topics
 - Independent certification of ensemble elements
 - Clarification of definitions
 - Coordination with changes in respiratory protection configuration
 - Clarification of “subdued, non-reflective”
 - Clarification of “visible breach of integrity”
 - Adopt 1994 requirements where possible
 - Ergonomic test - acceptance criteria; clarification of movements
 - Sample sizes (numbers, gender, etc.)
 - FR thread for levels other than LERL-1
 - Donning/doffing times
 - Liquid Integrity Test (vs. Rain Cabinet Test vs. Expulsion Test)



Public Comments (Continued)

- Topics (Continued)
 - Audible signature test – acceptance criteria; methodology
 - Chemical permeation test – dermal vs. respiratory threat; gas concentrations
 - Total Heat Loss (THL) requirement
 - Flash Fire Test – requirement; applicability
 - Clarification – inner vs. outer layers providing protection; test separate layers vs. composites
 - Man-in-Simulant Test (MIST) requirement
 - Tactical/Perimeter Tests (temperature conditions; clarification of test method)
 - Sample conditioning
 - Decontamination (single use vs. single exposure)
 - Miscellaneous clarifications



Major Changes Made to the Standard

- Adjusted TIC gas concentrations for chemical permeation test
- Added test method and requirements for color/visibility testing
- Adjusted total heat loss (THL) values
- Reduced number of samples required
- Added Annex A - “Acoustic Measurements and Calculations”
- Increased number of ergonomic test repetitions
- Adjusted acceptance criteria for flash fire test
- Added definitions and/or clarifying text



Changes to Certification Program

- Addition/revision of definitions: attestation, certification, certification organization.
- Miscellaneous clarifications.



Further Information

Debra Stoe

NIJ Standards and Testing Program Manager

debra.stoe@usdoj.gov